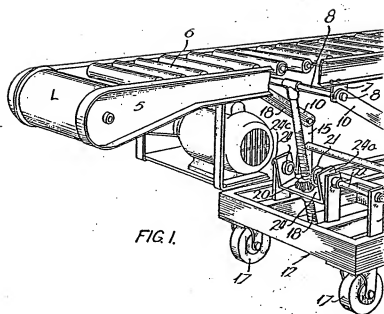


FIG. 2



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PATENT SPECIFICATION

Complete Specification Lodged _____ 2nd February, 1959.

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Applicant Munro Engineers Proprietary Limited.

Actual Inventor Raymond Carnegie Bishop.

Complete Specification Published _____ 6th August, 1959.

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Classification 59. 6; 59. 9.

International Classification B 65 g; B 66 f.

Drawing attached.

SEE COMPLETE SPECIFICATION.

Specification EL

"IMPROVEMENTS RELATING TO ELEVATORS"

The following statement is a full description of this invention, including the best method of performing it known to us -

This invention relates to elevators of the type having a driven endless carrier, e.g. a belt or slatted or roller conveyor and is particularly concerned with mobile elevators used in factories or the field for the loading and unloading of goods, grain or bulk materials.

The endless carrier is supported by and journaled in a leaf or boom pivotally mounted relative to a ground engaging or mobile support for adjustment of the working inclination of the leaf or boom relatively to floor or ground level.

It has been established in practice that the extent of adjustment in varying the working inclination or plane of the elevator is insufficient to meet the various positions necessary to conveniently locate the elevator between a loading and unloading position so as to reduce the manual labour to the minimum effort, which is the purpose of such elevators.

Thus it is the principal objective of the invention to provide an effective elevator of the type specified which in practice may be adjusted to the required working position between a position of parallelism with the ground or floor and any required working inclination from either end to the horizontal.

It is a further object of the invention to provide in such an elevator a boom or leaf mounted for pivotal and bodily movement relatively to a support, and conveniently adjustable at will to assume a working inclination between the range including the horizontal and an inclination thereto in projecting from either end of the elevator.

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With the above stated principal objective in view there is provided according to this invention an elevator of the type herein specified in which the leaf or boom has intermediate its length a first and second pivot axis connected respectively to a first and second lower transverse axis disposed in a ground engaging or mobile support, said first transverse axis being longitudinally movable at will relatively to the second transverse axis so as to effect an angular movement of the leaf or boom about the second pivot axis to raise or lower one end of the leaf or boom, and the second pivot axis is angularly movable relative to the second transverse axis to raise or lower the other end of the leaf or boom.

Conveniently the leaf or boom is angularly movable at will about the pivot axis connected to the relatively movable transverse axis so as to raise or lower the other end of the leaf or boom.

The individual or combined angular movements of the leaf or boom when efficiently controlled by the operative may raise or lower either end of the leaf or boom, or raise and lower the latter substantially parallelly whereby the leaf or boom may be arranged at an inclination from either end, or horizontally to accord with the relative levels of the loading and unloading positions for the elevator.

The accompanying drawings depict a practical arrangement of an elevator according to the invention.

In these drawings:-

Fig. 1 is a perspective view of the elevator partly in section.

Fig. 2 is a detail perspective view of the manually operable means for operating the screw and sleeve or nut connection to adjust the leaf or boom of the elevator.

Referring now to the drawings the elevator comprises the leaf or boom indicated generally at 5 having an endless belt or roller conveyor 6 which is of substantially conventional construction and has intermediate the ends at two spaced positions opposite aligning brackets 7 to each receive a transverse pivot pin or axle 8 and 9 to each of which is pivotally connected at each end one of a pair of complementary parallel links 10 and 11 downwardly inclined to connect the mobile support indicated generally at 12. That is to say there are two spaced pairs 10 and 11 of the above inclined links, which pairs are relatively inclined, and at the lower ends each pair is pivotally connected to one of the main individual transverse axes 13 and 14 in the mobile support 12.

One pair 10 of links is relatively shorter, i.e. at the lower or loading end of the boom or leaf, than the other longer pair 11 of links which latter are pivotally connected to the relatively movable transverse axis in the form of an axle 14.

The shorter pair of links 10 are pivotally connected through the axis 13 to the aligning upright members 15 upon the sides 16 of the hollow rectangular frame of the mobile support carried upon the transport wheels 17. The pivot axle 8 of the pair of links 10 has centrally attached thereto a depending screw 18 having mounted thereon a nut 20 in the form of a bevel gear in mesh with a bevel pinion 21 carried upon the transverse shaft 22 journaled in the uprights 23 mounted upon the mobile support. The nut 20 is supported against axial movement in the pivotal saddle 24 one side 24a of which is carried upon the shaft 22, the other side 24b pivoted to the post 24c. The end of the shaft 22 is squared as at 22a to receive a handle (not shown). If the handle is turned the bevel pinion 21 rotates the gear nut 20 to thus axially move the screw 18. The adjacent loading end L of the leaf or boom 5 will be raised or lowered as the screw 18. The pair of links 10 angularly move about the axis 13 to vary the inclination thereof, the leaf or boom pivoting about the axis 9. The longer pair of links 11 during the above movement describe a complementary and coactive angular movement about the pivot axle 14 being freely

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mounted thereon for that purpose.

According to the extent of this movement there may be bodily movement of the discharge end of the elevator responsive to the angular movement of the links 11.

The pivot axle 14 has mounted upon each end a roller 25 to traverse the lower and inner flange 26 of the sides 16 of the mobile support 12. The pivot axle 14 has a central apertured boss 27 internally threaded to form a sleeve or nut through which projects a longitudinal feed screw 28, one end of which is journaled in the bearing 29 attached to the adjacent end 30 of the mobile support. The other end of the screw 28 is journaled in the transverse member 31 of the mobile support. A bevel gear 32 is mounted upon the feed screw 28, in mesh with the bevel pinion 33 carried upon the transverse countershaft 34 suitably mounted in the frame of the mobile support.

The countershaft 34 is drive coupled through the sprocket and chain connection 37 to the transverse shaft 38 journaled in the post 39.

The handle 40 on the shaft 38 upon being turned operates the bevel pinion 33 and gear 32 to thereby rotate the feed screw 28. The rotation of the feed screw 28 axially moves thereon the nut 27 whereby the rollers 25 transverse the flanges 26 of the sides 16 of the mobile support, i.e. to the left in Fig. 1, so as to raise in this instance the upper or discharge end D of the leaf or boom 5. To that end this movement effects an angular movement of the pair of links 11 to raise the adjacent end D and length of the leaf or boom 5, and in this movement the leaf or boom effects its angular movement about the pivot axis 8.

The inner pair of short links 10 and the upright screw 18 remain fixed in virtue of the latter, to constitute a closed system of links consequent upon the inability of said screw to move without the shaft 22 is turned by the operative. The loading or input end L of the leaf or boom 5 may then be adjusted to level or regulate the height of said end consequent upon the adjustment to the discharge end D, by operation of the handle upon the shaft 22 in the manner hereinbefore described.

The leaf or boom 5 then pivots about the axis 9 and the pivotal saddle 24 permits the upright screw 18 to describe a self adjusting or aligning movement as the pair of links 10 pivot about their axis 13.

The operative by operating both control screws can effect the accurate location of the leaf or boom between the loading and unloading levels.

For instance by operating the relatively shorter links and then the longer links or vice versa and by moving the above transverse axle 14, the leaf or boom can be positioned at a horizontal level or an inclination that could not be achieved by merely raising or lowering one end of the leaf or boom. Whilst both the handles upon the shafts are turned in unison, being closely disposed for that purpose, the leaf or boom is subjected to a bodily as well as an angular movement whereby the operative may conveniently locate or set each end of the leaf or boom at the required working level.

It will be understood that any other mechanical means may be provided to actuate the above pairs of links either individually or in unison.

If desired the above means may consist of hydraulic power units including power cylinders with valvular control manipulatable by the operative for the individual or dual operation of the two pairs of links.

The claims defining the invention are as follows:

1. An elevator of the type herein specified in which the leaf or boom has intermediate its length a first and second pivot axis connected respectively to a first and second

lower transverse axis disposed in a ground engaging or mobile support, said first transverse axis being longitudinally movable at will relatively to the second transverse axis so as to effect an angular movement of the leaf or boom about the second pivot axis to raise or lower one end of the leaf or boom, and the second pivot axis is angularly movable relative to the second transverse axis to raise or lower the other end of the leaf or boom. (12th February, 1958).

2. An elevator of the type herein specified in which the leaf or boom is pivotally connected at each of two spaced axes intermediate its length to one of a pair of downwardly directed or inclined pairs of links, each pivotally connected through a transverse axis to a ground engaging or mobile support, one of said transverse axis being mounted for relative longitudinal movement, means for moving said latter axis to angularly move the pair of links connected thereto so as to raise the end of the leaf or boom connected to said links, the leaf or boom angularly moving about its pivotal axis between the upper ends of the other pair of links, and means for angularly moving said other pair of links about their transverse axis to raise or lower the other end of the leaf or boom during which the latter angularly moves about its pivot axis between the first mentioned pair of links which describe a self adjusting angular movement about their transverse axis. (12th February, 1958).

3. An elevator according to claim 2 wherein the pair of links pivotally connected to the movable transverse axis are freely mounted upon the axle constituting said axis, a roller or the like being mounted upon said axle to traverse a track in the ground engaging or movable support and a screw and sleeve connection coupled to said axle and operable at will to longitudinally move the axle towards or away from the other and relatively fixed transverse axis. (12th February, 1958).

4. An elevator according to claim 2 or 8, wherein the pair of links connected to the fixed transverse axis are connected at the upper end to a transverse axle carried in and forming one of the pivot axes of the leaf or boom, a self aligning screw and sleeve connection coupled to the axle, and means operable at will to actuate said connection to effect the angular movement of said pair of links. (12th February, 1958).

5. An elevator according to claim 3, wherein the screw and sleeve connection comprises a longitudinal screw journaled in the ground engaging or mobile support, a sleeve nut connected to the transverse axle, a drive shaft geared to the longitudinal screw, and a handle or the like fitted to the shaft. (12th February, 1958).

6. An elevator according to claim 4 wherein the screw and sleeve connection comprises an upright screw coupled to the transverse axle, a bevel gear mounted upon said screw and threaded to form a nut, a saddle pivotally mounted upon the ground engaging or mobile support and bearing upon the underside of the bevel gear, a bevel pinion in mesh with said gear, a shaft carrying the bevel pinion, and a handle or the like fitted to the shaft. (12th February, 1958).

7. An elevator of the type herein specified in which the leaf or boom is pivotally connected at each of two spaced pivot points intermediate its length to one of two pairs of downwardly inclined and transversely aligning links each pivotally connected to a

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lower transverse axis disposed in a ground engaging or mobile support, said first transverse axis being longitudinally movable at will relatively to the second transverse axis so as to effect an angular movement of the leaf or boom about the second pivot axis to raise or lower one end of the leaf or boom, and the second pivot axis is angularly movable relative to the second transverse axis to raise or lower the other end of the leaf or boom. (12th February, 1958).

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3. An elevator according to claim 2 wherein the pair of links pivotally connected to the movable transverse axis are freely mounted upon the axle constituting said axis, a roller or the like being mounted upon said axle to traverse a track in the ground engaging or movable support and a screw and sleeve connection coupled to said axle and operable at will to longitudinally move the axle towards or away from the other and relatively fixed transverse axis. (12th February, 1958).

4. An elevator according to claim 2 or 3, wherein the pair of links connected to the fixed transverse axis are connected at the upper end to a transverse axle carried in and forming one of the pivot axes of the leaf or boom, a self aligning screw and sleeve connection coupled to the axle, and means operable at will to actuate said connection to effect the angular movement of said pair of links. (12th February, 1958).

5. An elevator according to claim 3, wherein the screw and sleeve connection comprises a longitudinal screw journaled in the ground engaging or mobile support, a sleeve nut connected to the transverse axle, a drive shaft geared to the longitudinal screw, and a handle or the like fitted to the shaft. (12th February, 1958).

6. An elevator according to claim 4 wherein the screw and sleeve connection comprises an upright screw coupled to the transverse axle, a bevel gear mounted upon said screw and threaded to form a nut, a saddle pivotally mounted upon the ground engaging or mobile support and bearing upon the underside of the bevel gear, a bevel pinion in mesh with said gear, a shaft carrying the bevel pinion, and a handle or the like fitted to the shaft. (12th February, 1958).

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